APPENDIX A:

INTEGRATED REPORT TABLES

Table 1: Summary of use support – assessed and reported.

Designated Beneficial Use	Total Size	Size Assessed	Size Fully Supporting	Size Not Supporting	Size Not Attainable
Rivers (Miles)					
Full Body Contact (Recreational Use)	63,130	29,420	8,031	21,389	0
Human Health and Wildlife (Fishable Use)	63,130	8,862	3,409	5,453	0
Public Water Supply[1]	384	25	0	25	0
Warm Water Aquatic Life (Aquatic Life Use)	63,130	36,332	25,948	10,384	122
Lake Michigan Shoreline (Miles)					
Full Body Contact (Recreational Use)	59	59	4	55	0
Human Health and Wildlife (Fishable Use)	59	59	0	59	0
Public Water Supply	31	31	31	0	0
Warm Water Aquatic Life (Aquatic Life Use)	59	59	55	4	0
Lake Michigan (Acres)					
Human Health and Wildlife (Fishable Use)	154,176	154,176	0	154,176	0
Lakes and Reservoirs (Acres)					
Full Body Contact (Recreational Use)	127,539	37,041	29,035	8,006	0
Human Health and Wildlife (Fishable Use)	127,539	77,845	27,290	50,555	0
Public Water Supply	29,541	16,615	230	16,385	0
Warm Water Aquatic Life (Aquatic Life Use)	127,539	10,379	3,754	6,625	0

Source: IDEM's assessment database

[1]While all waterbodies in Indiana are designated for aquatic life and recreational uses, not all are designated for drinking water use. There are a total of 29,541 lake acres and 111 stream miles (including 35 miles of shoreline) designated for drinking water in Indiana.

Table 2: Atlas information.

Description	Value	Units
Indiana population[1]	6,483,802	persons
Indiana surface area[2]	36,291	square miles
Total miles of rivers and streams[3]	63,130	miles
Number of publicly-owned lakes/ reservoirs/ ponds[4]	575+	-
Publicly-owned lakes/ reservoirs/ ponds[4]	106,205	acres
Great Lakes[4]	154,176	acres
Great Lakes shoreline[5]	59	miles
Fresh water wetlands[6]	813,000	acres

Sources: [1]U.S. Census Bureau, 2010 census [2]State Information Center [3]2014 Reach Index [4]U.S. EPA 1993 [5]Indiana Reach Index [6]Rolley 1991

Table 3: SRF investments in SFY 2012 and 2013.

SRF program	Number of projects	Loan amount	Savings realized
Clean Water	43	$444,497,000	$127,337,231
Drinking Water	25	$95,964,612	$32,447,233

Source: SRF tracking database

Table 4: 205(j) and 319(h) Investments in SFY 2003-2013. Table does not include an additional $434,328 from the American Recovery and Reinvestment Act of 2009, which was awarded through the SRF Program.

205(j)			319(h)		
FFY	**Number of Projects**	**Amount Awarded**	**FFY**	**Number of Projects**	**Amount Awarded**
2003	6	$507,054	2003*	34	$4,544,480
2004	6	$497,220	2004**	27	$4,159,332
2005	3	$254,430	2005***	21	$3,747,145
2006	2	$251,310	2006	18	$3,374,538
2007	2	$148,915	2007	12	$3,022,961
2008	0	0	2008	8	$2,967,181
2009	2	$271,432	2009	9	$2,759,609
2010	2	$293,753	2010	11	$3,653,209
2011	4	$699,775	2011	8	$2,457,215
2012	2	$331,250	2012	8	$2,221,471
2013	2	$337,750	2013	7	$2,276,973

* includes 2 in-house projects totaling $526,122
** includes 2 in-house projects totaling $248,792
*** includes 1 in-house project totaling $155,686

Table 5: Summary of changes in water quality in watersheds reported to U.S. EPA under success measures (SP-12 and WQ-10) programs

Stream Name	HUC	Stream Miles Improved	Impairment Removed	List Year Removed
Pigeon	05140202	32	Chlordane	2002
Lower Clifty Creek	051202060107	8.12	E. coli	2010
West Fork Big Walnut	051202030104	34.64	E. coli	2010
East Fork Big Walnut	051202030102	15.76	E. coli	2010
Bull Run	071200011308	25.09	Impaired biotic communities	2012
Metcalf Ditch	041000030504	14.33	Impaired biotic communities	2012
North Prong Stotts Cr	051202011404	1.25	Impaired biotic communities	2012
South Prong Stotts Cr	051202011405	13.23	Impaired biotic communities	2012
Mill Creek	051201011404	13.14	Impaired biotic communities	2012
Jenkins Ditch	051201070308	2.13	Impaired biotic communities	2012

Table 6: OWQ's primary water quality monitoring objectives and the types of monitoring approaches needed to meet them.

Key	Monitoring Objective	Probabilistic	Targeted	Priority Rationale
A	Conduct water quality assessments pursuant to CWA Section 305(b) to support the development of Indiana's Integrated Report to U.S. EPA	X	X	Required for CWA Section 106 funding to meet CWA goals
B	Development of Indiana's CWA Section 303(d) List of Impaired Waters for Indiana's Integrated Report	X	X	Required for CWA Section 106 funding to meet CWA goals
C	Develop Total Maximum Daily Loads to address impairments identified on Indiana's 303(d) list	X	X	Required for CWA Section 106 funding to meet CWA goals
D	Determine trends and trophic status of Indiana's lakes and reservoirs under CWA Section 314		X	Required for CWA Section 106 funding to meet CWA goals
E	Develop water quality criteria, including nutrient criteria for lakes and reservoirs, rivers and streams	X	X	Required for CWA Section 106 funding to meet CWA goals
F	Support watershed planning and restoration efforts	X	X	Required for to CWA Section 319 funding and to meet performance measures in U.S. EPA's Strategic Plan
G	Identify water quality improvements accomplished by watershed restoration efforts funded through CWA programs		X	Required to meet performance measures in U.S. EPA's Strategic Plan
H	Support the development of public health advisories related to the use of Indiana's water resources, including fish consumption advisories and recreational use advisories		X	Supports protection of human health
I	Determine ambient ground water quality and extent of contaminated areas		X	Supports protection of human health
J	Support source water protection including both ground water and surface source water supplies		X	Supports protection of human health
K	Support development of National Pollutant Discharge Elimination System permit limits	X	X	Required for CWA Section 106 funding to meet CWA goals
L	Develop environmental indicators, including indices of biological integrity, for use in making water quality assessments	X		Supports primary monitoring objectives (A-C, E)
M	Responding to citizen complaints about activities that may be impacting private wells		X	Mandated by State Statute

Modified from IDEM OWQ's Surface Water Monitoring Strategy, 2011-2019

Table 7: Reduction of sediment, phosphorus, and nitrogen reaching Indiana waters.

Dates	Sediment Reduction (ton/year)	Phosphorus Reduction (lbs/year)	Nitrogen Reduction (lbs/year)
2000-2003	35,870	42,662	85,710
2004	18,561	21,993	44,527
2005	33,415	39,347	79,349
2006	25,831	40,538	99,434
2007	23,279	126,529	125,848
2008	18,119	25,400	65,367
2009	7,965	15,479	15,319
2010	33,420	31,374	66,400
2011	28,880	33,434	70,450
2012	47,616	94,980	141,709
2013	54,507	92,360	170,376

Source: IDEM OWQ nonpoint source project tracking database

Table 8: External data sets determined by IDEM to meet the necessary data quality requirements for 305(b) assessment and 303(d) listing purposes.

Source	Type of Assessment
American Water Company	Drinking water use support
City of Elkhart	Aquatic life use support; Fishable use support
City of Indianapolis	Recreational use support; Drinking water use support; Aquatic life use support
City of Muncie	Recreational use support; Drinking water use support; Aquatic life use support
City of South Bend	Recreational use support
City of Valparaiso	Recreational use support; Drinking water use support; Aquatic life use support
Marion County Health Department	Recreational use support; Drinking water use support; Aquatic life use support

Table 9: Summary of water quality assessment methodology for determining designated use support.

Aquatic Life Use Support - Rivers and Streams		
Toxicants	Dissolved metals, pesticides, polyaromatic hydrocarbons (PAH), free cyanide, ammonia were evaluated on a site-by-site basis and judged according to the magnitude of the exceedance(s) of Indiana's WQS and the number of times the exceedance(s) occurred. For any one pollutant (grab or composite samples), the following assessment criteria are applied to data sets consisting of three or more measurements.	
	Fully Supporting	**Not Supporting**
	≤1 exceedance of the acute criteria within a three-year period, and ≤1 exceedance of the chronic criteria for aquatic life within a three-year period.	>1 exceedance of the acute or chronic criteria for aquatic life within a three-year period.
Conventional inorganics	Dissolved oxygen, pH, sulfates, chlorides were evaluated for the exceedance(s) of Indiana's WQS. For any one pollutant, the following assessment criteria are applied to data sets consisting of three or more measurements.	
	Fully Supporting	**Not Supporting**
	For dissolved oxygen, one or more samples may be <4mg/L, but no more than 10% of all measurements are <5mg/L. For other conventional inorganics, criteria are exceeded in ≤10% of measurements.	For dissolved oxygen, one or more samples <4mg/L and more than 10% of all measurements are <5mg/L. For other conventional inorganics, criteria are exceeded in >10% of measurements.

<table>
<tr><td>Nutrients</td><td colspan="2">Nutrient conditions were evaluated on a site by site basis using the benchmarks described below. In most cases, two or more of these conditions must be met on the same date in order to classify a waterbody as impaired. This methodology assumes a minimum of three sampling events.
Total Phosphorus: One or more measurements >0.3 mg/L
Nitrogen (measured as NO_3 + NO_2) – One or more measurements >10.0 mg/L
Dissolved Oxygen (DO) -- Measurements below the water quality standard of 4.0 mg/l or measurements that are consistently at/close to the standard, in the range of 4.0-5.0 mg/L or values >12.0 mg/L
pH measurements -- Measurements above the water quality standard of 9.0 or measurements that are consistently at/close to the standard, in the range of 8.7-9.0
Algal Conditions -- Algae are described as “excessive” based on field observations by IDEM scientists.</td></tr>
<tr><td rowspan="2">Benthic aquatic macroinvertebrate Index of Biotic Integrity (mIBI) Scores (Range of possible scores is 12-60)</td><td>Fully Supporting</td><td>Not Supporting</td></tr>
<tr><td>• mIBI >36</td><td>• mIBI <36</td></tr>
<tr><td>Fish community (IBI) Scores (Range of possible scores is 6-60)</td><td>• IBI ≥36</td><td>• IBI <36</td></tr>
<tr><td>Qualitative habitat use evaluation (QHEI) (Range of possible scores is 0-100)</td><td colspan="2">The Qualitative Habitat Evaluation Index (QHEI) is not used to determine aquatic life use support. Rather, the QHEI is an index designed to evaluate the lotic habitat quality important to aquatic communities and is used in conjunction with mIBI or IBI data, or both to evaluate the role that habitat plays in waterbodies where impaired biotic communities (IBC) have been identified. QHEI scores are calculated using six metrics: substrate, instream cover, channel morphology, riparian zone, pool/riffle quality, and gradient. A higher QHEI score represents a more diverse habitat for colonization of aquatic organisms. IDEM has determined that a QHEI total score of <51 indicates poor habitat. For streams where the macroinvertebrate community (mIBI or mHab) or fish community (IBI) scores indicate IBC, QHEI scores are evaluated to determine if habitat is the primary stressor on the aquatic communities or if there may be other stressors/pollutants causing the IBC.</td></tr>
</table>

Aquatic Life Use Support – Lakes and Reservoirs		
	Fully Supporting	**Not Supporting**
Indiana Department of Natural Resources surveys of the status of sport fish communities in lakes and information on trout stocking.	Supports cold water fishery, including native Cisco and stocked trout, or both.	Native Cisco population is gone or lake unable to support stocked trout and lake attributes, or both, appear to contribute to warm water fishery condition.
Temperature and pH	Lakes in which thermal modifications have caused an adverse effect on aquatic life and lakes that do not meet Indiana's WQS for pH have been assessed as not supporting of aquatic life use.	
Fish Consumption Use Support (Human Health)		
Available fish tissue data for the most recent 12 years of data collection are evaluated. Only waters for which sufficient fish tissue data were available were assessed for fish consumption All results from sampling locations considered representative of a given assessment unit (lake or reservoir; stream or stream reach) must be below the benchmarks for mercury and PCBs in order to be assessed as fully supporting. For PCBs, all waters with a single sample result for a given species exceeding the applicable benchmark are classified as impaired. For mercury, all waters with a trophic level weighted arithmetic mean result (calculated with all the samples collected during the same sampling event) that exceeds the applicable benchmark are classified as impaired.		
	Fully Supporting	**Not Supporting**
Mercury in Fish Tissue	Trophic level weighted arithmetic mean concentration values for all sampling events are ≤0.3 mg/kg wet weight	Trophic level weighted arithmetic mean concentration values for one or more sampling events are >0.3 mg/kg wet weight
	Fully Supporting	**Not Supporting**
PCBs in Fish Tissue	Actual concentration values for all samples are ≤0.02 mg/kg wet weight	Actual concentration values for one/more samples are >0.02 mg/kg wet weight

<table>
<tr><th colspan="3">Recreational Use Support (Human Health) – All Waters</th></tr>
<tr><td colspan="3">IDEM has two different criteria for recreational use assessments depending on the type of data set being used in making the assessment. For data sets consisting of five equally spaced samples over a 30 day period, we apply two tests, both of which are based on the U.S. EPA's Ambient Water Quality Criteria for Bacteria - 1986 (U.S. EPA, 1986), which provides the foundation for Indiana's WQS for recreational use. For data sets consisting of 10 or more grab samples where no five of which are equally spaced over a 30 day period, the 10% rule is applied. When both types of data sets are available, the assessment decision is based on the data set consisting of five samples equally spaced over a 30 day period.</td></tr>
<tr><td></td><td>Fully Supporting</td><td>Not Supporting</td></tr>
<tr><td>Bacteria (E. coli): at least five equally spaced samples over 30 days. (cfu = colony forming units)</td><td>Geometric mean does not exceed 125 cfu/100mL</td><td>Geometric mean exceeds 125 cfu/100mL.</td></tr>
<tr><td>Bacteria (E. coli): grab samples (cfu = colony forming units)</td><td>Not more than 10% of measurements are >576 cfu/100ml (for waters infrequently used for full body contact) or 235 cfu/100mL (for bathing beaches).

And

Not more than one sample is >2,400 cfu/100mL.</td><td>More than 10% of samples are >576 cfu/100mL or more than one sample is >2,400 cfu/100mL.</td></tr>
<tr><th colspan="3">Drinking Water Use Support – Rivers and Streams</th></tr>
<tr><td colspan="3">Rivers are designated for drinking water uses if a community water supply has a drinking water intake somewhere along the segment. When IDEM has data for a segment with a drinking water intake, those data are compared to the applicable ambient water quality criteria in Indiana's WQS to determine if the drinking water use is met. The appropriate water quality criteria are applied for specific substances identified in the WQS. Information regarding non-naturally occurring taste and odor producing substances not specifically identified in the WQS are reviewed within the context of a water treatment facility's ability to meet Indiana's drinking WQS using conventional treatment.</td></tr>
<tr><td rowspan="3">Toxicants</td><td colspan="2">Dissolved metals, pesticides, PCBs, free cyanide were evaluated on a site by site basis and judged according to magnitude of the exceedance(s) of Indiana's WQS for point of water intake and the number of times exceedance(s) occurred. For any one pollutant (grab or composite samples), the following assessment criteria are applied.</td></tr>
<tr><td>Fully Supporting</td><td>Not Supporting</td></tr>
<tr><td>Not more than one exceedance of the acute or chronic criteria for human health within a three year period.</td><td>More than one exceedance of the acute or chronic criteria for human health within a three year period.</td></tr>
</table>

Conventional inorganics	Total dissolved solids, specific conductance, sulfate, chloride, nitrite-N and nitrogen (measured as NO_3 + NO_2) were evaluated for the exceedance(s) of Indiana's WQS for point of water intake and the number of times the exceedance(s) occurred. For any single pollutant (grab or composite samples), the following assessment criteria are applied to data sets consisting of three or more measurements.	
	Fully Supporting	**Not Supporting**
	Not more than one exceedance of the acute or chronic criteria for human health within a three year period.	More than one exceedance of the acute or chronic criteria for human health within a three year period.
Taste and odor producing substances	**Fully Supporting**	**Not Supporting**
	Taste and odor substances not present in quantities sufficient to interfere with production of drinking water by conventional treatment	Taste and odor substances present in quantities requiring additional treatment by the public water supply to prevent taste and odor problems

Recreational Use Support (Aesthetics) – Lakes and Reservoirs		
	Fully Supporting	**Not Supporting**
Natural Lakes	Not more than 10% of all TP values >54 ug/L and their associated Chla values are <20ug/L	Less than 10% of all TP values are >54 ug/L but their associated Chla values are >20ug/L, and the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions Or More than 10% of all TP values are >54 ug/L with associated Chla values <4ug/L, but the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions Or More than 10% of all TP values are >54 ug/L with associated Chla values >4ug/L
	Fully Supporting	**Not Supporting**
Reservoirs	Not more than 10% of all TP values >51 ug/L and their associated Chla values are <25ug/L	Less than 10% of all TP values are >51 ug/L but their associated Chla values are >25 ug/L and the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions Or More than 10% of all TP values are >51 ug/L with associated Chla values <2ug/L, but the TSI score for the lake indicates eutrophic (32-46) or hypereutrophic (>47) conditions Or More than 10% of all TP values are >51 ug/L with associated Chla values >2ug/L

Drinking Water Use Support – Lakes and Reservoirs	
Information on the application of pesticides to surface drinking water reservoirs	Reservoirs or lakes that serve as source water for public water supplies that received pesticide (algaecide) application permits for algae were classified as not supporting because additional treatment by the public water supply was required to prevent taste and odor problems.
Other Assessments – Lakes and Reservoirs	
Indiana Trophic State Index (TSI)	Nutrients, ammonia, dissolved oxygen, light transmission and light penetration in the water column turbidity, and algae growth were used to determine TSI scores. Trophic scores were used to classify lakes according to their trophic state. Lake trends were also assessed for lakes with two or more trophic scores if at least one of the scores was less than five years old. Trophic scores and lake trends are not used to determine use support status. These assessments are conducted to fulfill Clean Water Act Section 314 reporting requirements for publicly owned lakes and reservoirs.

Source: IDEM OWQ 2014 Consolidated Assessment and Listing Methodology

Table 10: Individual use support summary for Indiana streams.

Designated Beneficial Uses						
Designated Beneficial Use	**Total Size (Miles)**	**Size Assessed (Miles)**	**Percent Assessed**	**Size Fully Supporting (Miles)**	**Size Not Supporting (Miles)**	**Size Not Attainable (Miles)**
Full Body Contact (Recreational Use)	63,130	29,420	47%	8,031	21,389	0
Human Health and Wildlife (Fishable Use)	63,130	8,862	14%	3,409	5,453	0
Public Water Supply	384	25	7%	0	25	0
Warm Water Aquatic Life (Aquatic Life Use)	63,130	36,332	28%	25,948	10,384	122

Source: IDEM 305(b) assessment database

Table 11: Summary of national and state causes impairing Indiana streams.

Causes of Impairment	Total Size (miles)
Pathogens	
Escherichia coli	21,299
Oxygen Depletion	
Oxygen, Dissolved	2,790
Flow Alterations	
Low flow alterations	91
Habitat alterations (Including Wetlands)	
Physical substrate habitat alterations	195
Thermal Impacts	
Temperature, water	105
Nutrients (Macronutrients/Growth Factors)	
Nutrient/Eutrophication Biological Indicators	2,036
Organic Enrichment (Sewage) Biological Indicators	91
Toxic Inorganics	
Ammonia (Un-ionized)	100
Chloride	170
Cyanide (as free cyanide)	197
Sulfates	424
Toxic Organics	
Dioxin (including 2,3,7,8-TCDD)	364
Hexachlorocyclohexane (mixture)	58
Polycyclic Aromatic Hydrocarbons (PAHs) (Aquatic Ecosystems)	25
PCB (Fish Tissue)	4,910
PCB (Water)	364
Metals	
Mercury (Fish Tissue)	759
Mercury (Water)	268

Pesticides	
Atrazine	7
pH/Acidity/Caustic Comditions	
pH	285
Sedimentation	
Sedimentation/Siltation	292
Oil and Grease	
Oil and Grease	27
Algae	
Chlorophyll-a	111
Biological Integrity (Bioassessments)	
Impaired Biotic Communities	7,091

Source: IDEM 305(b) assessment database

Table 12: Summary of national and state sources impairing Indiana streams.

Sources of Impairment	Total Size (miles)
Agriculture – Animal Feeding/Handling Operations (Nonpoint Source – Not Regulated)	
Animal Feeding Operations (NPS)	8,207
Managed Pasture Grazing	54
Permitted Runoff from Confined Animal Feeding Operations (CAFOs)	1,931
Agriculture	1,133
Livestock (Grazing or Feeding Operations)	5,552
Unrestricted Cattle Access	605
Agriculture – Crop Production	
Crop Production with Subsurface Drainage	2,654
Crop Production (Crop Land or Dry Land)	247
Construction	
Site Clearance (Land Development or Redevelopment)	49
Ground Water Loadings	
Contaminated Ground Water	13

Habitat Alterations (Not Directly Related to Hydromodification)	
Impacts from Hydrostructure Flow Regulation/modification	505
Loss of Riparian Habitat	1312
Streambank Modifications/destabilization	481
Upstream Impoundments (e.g., Pl-566 NRCS Structures)	15
Hydromodification	
Channelization	254
Dam Construction (Other than Upstream Flood Control Projects)	21
Industrial Permitted Discharge	
Industrial Point Source Discharge	342
RCRA Hazardous Waste Sites	3
Wet Weather Discharges (Point Source and Combination of Stormwater, SSO or CSO)	26
Land Application Waste Sites	
Illegal Dumps or Other Inappropriate Waste Disposal	626
On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	1,214
Legacy/Historical Pollutants	
Acid Mine Drainage	391
Contaminated Sediments	306
Historic Bottom Deposits (Not Sediment)	65
Impacts from Abandoned Mine Lands (Inactive)	18
Municipal Permitted Discharges (Direct and Indirect)	
Combined Sewer Overflows	1,435
Municipal Point Source Discharges	2,503
Package Plant or Other Permitted Small Flows Discharges	2,881
Sanitary Sewer Overflows (Collection System Failures)	13
Stormwater Permitted Discharges (Direct and Indirect)	
Unspecified Urban Stormwater	843

Natural Sources	
Waterfowl	3,643
Wildlife Other than Waterfowl	3,643
Upstream/Downstream Source	115
Natural Sources	1,076
Resource Extraction	
Dredge Mining	64
Reclamation of Inactive Mining	195
Spills and Unpermitted Discharges	
Sewage Discharges in Unsewered Areas	5,896
Urban-related Runoff/Stormwater (Other than Regulated Discharges)	
Golf Courses	10
Highways, Roads, Bridges, Infrastructure (New Construction)	14
Post-development Erosion and Sedimentation	19
Wastes from Pets	186
Impervious Surface/Parking Lot Runoff	538
Urban Runoff/Storm Sewers	199
Other Sources	
Source Unknown	8,620
Non-Point Source	15,752

Source: IDEM 305(b) assessment database

Table 13: Individual use support summary for Indiana's Great Lakes shoreline.

Designated Beneficial Uses						
Designated Beneficial Use	**Total Size (Miles)**	**Size Assessed (Miles)**	**Percent Assessed**	**Size Fully Supporting (Miles)**	**Size Not Supporting (Miles)**	**Size Not Attainable (Miles)**
Full Body Contact (Recreational Use)	59	59	100%	4	55	0
Human Health and Wildlife (Fishable Use)	59	59	100%	0	59	0
Public Water Supply	31	31	100%	31	0	0
Warm Water Aquatic Life (Aquatic Life Use)	59	59	100%	55	4	0

Source: IDEM 305(b) assessment database

Table 14: Summary of national and state causes impairing Indiana's Great Lakes shoreline.

Causes of Impairment	Total Size (Miles)
Pathogens	
Escherichia coli	55
Toxic Inorganics	
Cyanide (as free cyanide)	4
Toxic Organics	
PCB (Fish Tissue)	59
Metals	
Mercury (Fish Tissue)	59

Source: IDEM 305(b) assessment database

Table 15: Summary of National and State Sources Impairing Great Lakes Shoreline.

Sources of Impairment	Total Size (Miles)
Land Application Waste Sites	
On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)	19
Municipal Permitted Discharges (Direct and Indirect)	
Illicit Connections/Hook-ups to Storm Sewers	19
Other Sources	
Source Unknown	59
Non-Point Source	5

Source: IDEM 305(b) assessment database

Table 16: Individual use support summary for Lake Michigan.

Designated Beneficial Uses						
Designated Beneficial Use	**Total Size (Acres)**	**Size Assessed (Acres)**	**Percent Assessed**	**Size Fully Supporting (Acres)**	**Size Not Supporting (Acres)**	**Size Not Attainable (Acres)**
Aquatic life use	-	-	-	-	-	-
Fishable uses	154,176	154,176	100%	0	154,176	0
Drinking water supply	-	-	-	-	-	-
Recreational use (human health)	-	-	-	-	-	-

Source: IDEM 305(b) assessment database

Table 17: Summary of national and state causes impairing Lake Michigan.

Causes of Impairment	Total Size (Acres)
Bioaccumulative Chemicals of Concern	
PCBs (Fish Tissue)	154,176
Mercury (Fish Tissue)	154,176

Source: IDEM 305(b) assessment database

Table 18: Summary of national and state sources impairing Lake Michigan.

Sources of Impairment	Total Size (Acres)
Source Unknown (Applied to Fish Tissue Impairments)	154,176

Source: IDEM 305(b) assessment database

Table 19: Individual use support summary for Indiana lakes.

Designated Beneficial Uses						
Designated Beneficial Use	**Total Size (Acres)**	**Size Assessed (Acres)**	**Percent Assessed**	**Size Fully Supporting (Acres)**	**Size Not Supporting (Acres)**	**Size Not Attainable (Acres)**
Full Body Contact (Recreational Use)	127,539	37,041	29%	29,035	8,006	0
Human Health and Wildlife (Fishable Use)	127,539	77,845	61%	27,290	50,555	0
Public Water Supply Supply	29,541	16,615	56%	230	16,385	0
Warm Water Aquatic Life (Aquatic Life Use)	127,539	10,379	8%	3,754	6,625	0

Source: IDEM 305(b) assessment database

Table 20: Summary of national and state causes impairing lakes and reservoirs.

Causes of Impairment	Total Size (Acres)
Pathogens	
Escherichia coli	983
Thermal Impacts	
Temperature, water	1,556
Nutrients (Macronutrients/Growth Factors)	
Phosphorus (Total)	7,023
Toxic Organics	
PCB (Fish Tissue)	38,290
Metals	
Mercury (Fish Tissue)	14,736
Mineralization	
Taste and Odor	16,385
pH/Acidity/Caustic Conditions	
pH	105
Algae	
Chlorophyll-a	16,385
Other Causes	
Cause Unknown	6,520

Source: IDEM 305(b) assessment database

Table 21: Summary of national and state sources impairing lakes and reservoirs.

Sources of Impairment	Total Size (Acres)
Agriculture – Animal Feeding Operations (Nonpoint Source – Not Regulated)	
Agriculture	30
Industrial Permitted Discharges	
Industrial Point Source Discharge	1,556
Legacy/Historical Pollutants	
Acid Mine Drainage	105
Municipal Permitted Discharges (Direct and Indirect)	
Combined Sewer Overflows	30
Urban-related Runoff/Stormwater (Other than Regulated Discharges)	
Impervious Surface/Parking Lot Runoff	30
Other Sources	
Source Unknown	52,202
Nonpoint Source	7,054

Source: IDEM 305(b) assessment database

Table 22: Lake classification scheme for Indiana.

Trophic state		TSI score
Increasing eutrophication ↓	Oligotrophic	Less than 15 points on the Indiana TSI scale
	Mesotrophic	16-31 TSI points
	Eutrophic	32-46 TSI points
	Hypereutrophic	Greater than 47 TSI points
	Dystrophic	Lakes with little plant growth despite the presence of nutrients; usually due to high humic conditions

Table 23: Trophic status of lakes assessed 2005-2013.

Trophic Status	Number of Lakes	Total Size (Acres)
Oligotrophic	77	13,629
Mesotrophic	186	64,681
Eutrophic	100	16,378
Hypereutrophic	36	3,058
Dystrophic	0	0
Unknown	5	193

Source: IDEM 305(b) assessment database

Table 24 Trends in the trophic status of lakes assessed 2005-2013.

Trend	Number of Lakes	Total Size (Acres)
Improving	6	3,489
Stable	13	6,840
Fluctuating	35	12,672
Degrading	3	469

Source: IDEM 305(b) assessment database

Table 25: General wetland information.

Statistic	Amount
Total surface area of the state of Indiana	23,310,000 acres
Estimate of wetland acreage in Indiana circa 1700	5,600,000 acres
Wetland acreage in Indiana circa 1986 (National Wetland Inventory)	813,000 acres
Percent of surface area of Indiana covered by wetlands circa 1700	24.1%
Percent of surface area of Indiana covered by wetlands circa 1986	3.5%
Percent of total area of wetlands that are wholly or partially contained within managed lands (state, local, federal and private areas)	14%
Percent of Indiana's total wetlands that are 0.25 acres or less in size	11.6%
Percent of Indiana's total wetlands that are 0.50 acres or less in size	29.5%
Percent of Indiana's total wetlands that are 1.00 acres or less in size	46.9%
Percent of Indiana's total wetlands that are 5.00 acres or less in size	80.2%

Table 26: Type and extent of Indiana's wetlands.

Wetland type (Cowardin classification)	Historical Extent (Acres)	Extent as of mid-1980s (Acres)
Palustrine scrub/shrub (PSS)	Unknown	42,000
Palustrine forested (PFO)	Unknown	504,000
Palustrine emergent (PEMB)	Unknown	55,000
Palustrine emergent seasonally flooded (PEMC)	Unknown	68,000
Palustrine emergent semi-permanently flooded (PEMF)	Unknown	21,000
Palustrine open water (POW)	Unknown	99,000
Lacustrine limnetic open water (L10W)	Unknown	141,000
Riverine (R)	Unknown	53,000
Total wetland resources	5,600,000	813,000

Source: Rolley, 1991

Table 27: Calls, spills and fish kills reported from 1998 to 2013.

Year	Calls	Spills	Fish Kills
1998	2,649	1,393	28
1999	2,507	1,246	41
2000	2,930	1,491	43
2001	3,093	1,591	51
2002	3,043	1,666	55
2003	3,026	1,551	30
2004	2,829	1,406	37
2005	3,319	1,271	40
2006	3,319	1,368	31
2007	2,852	1,354	36
2008	3,250	1,588	39
2009	2,889	1,226	39
2010	2,411	1,035	47
2011	2,160	934	10
2012	2,163	665	11
2013	2,162	653	38

Source: IDEM ULCERS database

Table 28: Major sources of ground water contamination.

Contaminant Source	Highest Priority	Risk Factors*	Type of Contaminant**
Agricultural Activities			
Agricultural chemical facilities		A,C,H,I	5
Commercial fertilizer applications	X	A, C, D, E	5
Confined animal feeding operations	X	A, D, E	5, 9
Farmstead agricultural mixing and loading procedures			
Irrigation practices		A,C,H,I	1,2,5,8,9
Animal manure applications	X	A,C,H,I	5, 9
Pesticide applications		A,C,H,I	1,2
Storage and Treatment Activities			
Land application		A,C,H,I	5,9
Domestic and industrial residual applications		A,C,H,I	5,9
Material stockpiles		A,C,H,I	5,9
Storage tanks (above ground)		A,C,H,I	
Storage tanks (underground)	X	A, B, C, D, E, F	2, 3, 4
Surface impoundments			
Waste piles		A,C,H,I	5,9
Disposal Activities			
Deep injection wells			
Landfills (constructed prior to 1989)	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 6, 7, 8, 9
Permitted landfills (constructed 1989- present)			
Septic systems	X	A, C, D, E, F, G	1, 2, 3, 4, 5, 7, 9
Shallow (Class V) injection wells	X	A, B, C, D, E, I	1, 2, 3, 4, 5, 7, 9
Other			
Hazardous waste generators		A	
Hazardous waste sites		A	

Industrial facilities	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 9
Liquid transport pipelines (including sewer)		A	8
Materials spills (including during transport)	X	A, B, C, D, E, F	1, 2, 3, 4, 5, 7, 8, 9
Material transfer operations		A	
Small-scale manufacturing and repair shops		A, I	8
Mining and mine drainage		A	7,8
Salt storage (state and nonstate facilities) and road salting	X	A, C, D, E, F	6
Urban runoff		A, C, H, I	1, 2, 4, 5, 7, 8, 9

Source: U.S. EPA 2006a; 2007

*Factors considered in selecting the contaminant source: (A) human health and/or environmental risk (toxicity); (B) size of the population at risk; (C) location of source relative to drinking water source; (D) number and/or size of contaminant sources; (E) hydrogeologic sensitivity; (F) documented state findings, other findings; (G) high to very high priority in localized areas, but not over majority of Indiana; (H) geographic distribution/occurrence; and, (I) lack of information.

**Classes of contaminants associated with contamination source: (1) Inorganic pesticides; (2) Organic pesticides; (3) Halogenated solvents; (4) Petroleum compounds; (5) Nitrate; (6) Salinity/brine; (7) Metals; (8) Radionuclides; and, (9) Bacteria, protozoa and viruses.

Table 29: Indiana ground water protection programs and activities, where they are at in their development and the agency/agencies responsible for their implementation and/or enforcement.

Program or Activity	Status	State Agency/Organization
Active SARA Title III Program	Fully established	IDEM-OLQ[1]
Ambient ground water monitoring program	Under development	IDEM-OWQ
Aquifer sensitivity assessment	Fully established	IDEM-OWQ, IDNR, IGS[2], OISC[3]
Aquifer mapping/basin studies	Under development	IDNR, IDEM-OWQ
Aquifer/ hydrogeologic setting characterization	Fully established	IGS, IDEM-OWQ, IDNR
Bulk storage program for agricultural chemicals	Fully established	OISC
Comprehensive data management system	Under development	IDEM-OWQ
Complaint response program for private wells	Fully established	IDEM-OWQ
Confined animal feeding program	Fully established	IDEM-OWQ
Ground water discharge permits for constructed wetlands	Under development	IDEM-OWQ
Ground water Best Management Practices	Under development	OISC*, IDEM-OWQ
Ground water legislation	Fully established	IDEM, IDNR, OISC, ISDH
Ground water classification	Fully established	IDEM-OWQ
Ground water quality standards	Fully established	IDEM-OWQ
Land application of domestic and industrial residuals	Fully established	IDEM-OLQ
Nonpoint source controls	Under development	IDEM-OWQ
Oil and Gas	Fully established	IDNR
Pesticide State Management Plan	Pending	OISC*, IDEM-OWQ, IDNR, IGS
Pollution Prevention Program	Fully established	IDEM-OPPTA[4]
Reclamation	Fully established	IDNR
Resource Conservation and Recovery Act (RCRA) Primacy	Fully established	IDEM-OLQ
Sensitivity assessment for drinking water/ wellhead protection	Fully established	IGS, IDEM-OWQ

Program or Activity	Status	State Agency/Organization
Spill Monitoring	Fully established	IDEM-OWQ
State Superfund	Fully established	IDEM-OLQ
State RCRA Program incorporating more stringent requirements than RCRA primacy	Fully established	IDEM-OLQ
State septic system regulations	Fully established	ISDH
Underground storage tank installation requirements	Fully established	IDEM-OLQ
Underground Storage Tank Remediation Fund	Fully established	IDEM-OLQ
Underground Storage Tank Permit Program	Fully established	IDEM-OLQ
Underground Injection Control Program	Fully established for Class II wells	IDNR
Well abandonment regulations	Fully established	IDNR
Wellhead Protection Program	Fully established	IDEM-OWQ
Well installation regulations	Fully established	IDNR

*Indicates lead agency involved in enforcement or implementation.
"Pending" is used to describe those programs that have a written draft policy; "under development" is used to describe those programs still in the planning stage.

[1]OLQ, Office of Land Quality; [2]IGS, Indiana Geological Survey; [3]OISC, Office of the Indiana State Chemist; [4]OPPTA, Office of Pollution Prevention and Technical Assistance (IDEM).

Table 30: Indiana Ground Water Monitoring Network analytical results, 2012.

Analyte	Number of Samples	Number Below Detection Limit (BDL)	% BDL	Detection Limit	Median	Mean	Min	Max	Std. Dev.	EPA MCL	EPA SMCL or Recommendation (rec)	n > MCL or SMCL	% > MCL or SMCL
Alkalinity and Anions/Cations													
Alkalinity (mg/L)	326	0	0.00	1	273	267.30	21.6	767	82.75	--	--		
Calcium (mg/L)	326	8	2.50	0.1	80	79.68	0.1	300	39.55	--	--		
Chloride (mg/L)	326	37	11.30	2	12	23.63	2	400	39.75	--	--		
Magnesium (mg/L)	326	12	3.70	0.1	28	28.94	0.1	200	19.37	--	--		
Potassium (mg/L)	326	4	1.20	0.2	1.4	2.06	0.2	40	3.01	--	--		
Sodium (mg/L)	326	0	0.00	0.1	11	35.62	1.3	660	66.90	--	200 mg/L (rec)	11	3.37
Sulfate (mg/L)	326	46	14.10	5	34	69.46	5	1500	159.28	--	250 mg/L	15	4.60
Metals and Minerals													
Arsenic (ug/L)	326	211	64.70	2	2	4.18	2	69	6.79	10 ug/L	--	23	7.06
Barium (ug/L)	326	14	4.30	2	82.5	129.25	2	1100	148.30	2000 ug/L	--	0	0.00
Boron (ug/L)	326	3	0.90	5	28	102.24	5	1400	193.09	--	--		
Bromide (mg/L)	326	20	6.10	10	27	65.98	10	4000	257.81	--	--		
Chromium (ug/L)	326	324	99.40	2	2	2.02	2	6.2	0.26	100 ug/L	--	0	0.00
Copper (ug/L)	326	147	45.10	1	1.3	4.11	1	97	8.65	1300 ug/L	--	0	0.00
Iron (mg/L)	326	104	31.90	0.02	0.49	0.91	0.02	7.2	1.15	--	0.3 mg/L	180	55.21
Lead (ug/L)	326	323	99.10	1	1	1.05	1	10	0.59	15 ug/L	--	0	0.00
Nickel (ug/L)	326	91	27.90	1	1.6	2.07	1	19	1.71	--	100 ug/L (rec)	0	0.00
Silicon (mg/L)	326	0	0.00	0.1	14	14.69	6.7	36	4.36	--	--		
Strontium (mg/L)	326	10	3.10	2	0.18	1.68	0.002	37	4.20	--	4 mg/L (rec)	35	10.74

Analyte	Number of Samples	Number Below Detection Limit (BDL)	% BDL	Detection Limit	Median	Mean	Min	Max	Std. Dev.	EPA MCL	EPA SMCL or Recommendation (rec)	n > MCL or SMCL	% > MCL or SMCL
Zinc (ug/L)	326	106	32.50	5	11	32.67	5	600	71.03	--	5000 ug/L	0	0.00
Nitrogen, Nitrate-Nitrite													
Nitrogen, Nitrate-Nitrite (mg/L)	326	167	51.20	0.1	0.1	2.02	0.01	27	4.30	10 mg/L	--	17	5.21
Pesticides and Breakdown Products													
Acetochlor ESA (ug/L)	50	46	92.00	0.1	0.1	0.21	0.1	3.8	0.57	--	--		
Acetochlor OA (ug/L)	51	48	94.10	0.1	0.1	0.13	0.1	1.6	0.21	--	--		
Alachlor ESA (ug/L)	43	40	93.00	0.1	0.1	0.14	0.1	1.2	0.19	--	--		
Atrazine (ug/L)	325	324	99.70	0.1	0.1	0.10	0.1	0.3	0.01	3 ug/L	--	0	0.00
Metolochlor ESA (ug/L)	46	39	84.80	0.1	0.1	0.21	0.1	2	0.34	--	--		
Metolochlor OA (ug/L)	47	44	93.60	0.1	0.1	0.12	0.1	0.6	0.08	--	--		
Volatile Organic Compounds													
Benzo(a)pyrene (ug/L)	326	325	99.70	0.02	0.02	0.02	0.02	0.03	0.0005	0.2 ug/L	--	0	0.00
Methyl-t-butyl ether (MTBE) (ug/L)	325	324	99.70	0.5	0.5	0.51	0.5	3.8	0.18	--	20 ug/L	0	0.00
Tetrachloroethylene (ug/L)	325	324	99.70	0.5	0.5	0.51	0.5	4.7	0.23	5 ug/L	--	0	0.00
Toluene (ug/L)	325	324	99.70	0.6	0.5	0.50	0.5	0.6	0.01	1000 ug/L	--	0	0.00

***Disinfection Byproducts and plasticizers have been omitted from this list until further analysis and sampling can be conducted to determine the source

Table 31: Data layer analysis, 2008 to 2013.

Data Layer	Nitrogen, Nitrate-Nitrite		Arsenic	
	n	n>MCL	n	n>MCL
Sensitivity				
High	170	6	171	11
Moderate	39	2	39	2
Low	66	1	64	8
Variable	14	0	14	2
2006 USGS Land Cover				
Cultivated Crops	104	3	101	7
Deciduous Forest	26	1	26	0
Developed, High Intensity	2	0	2	0
Developed, Low Intensity	30	0	30	5
Developed, Medium Intensity	6	0	6	1
Developed, Open Space	61	3	63	3
Evergreen Forest	1	0	1	0
Hay/Pasture	39	2	39	4
Herbaceous	18	0	18	3
Woody Wetlands	2	0	2	0